

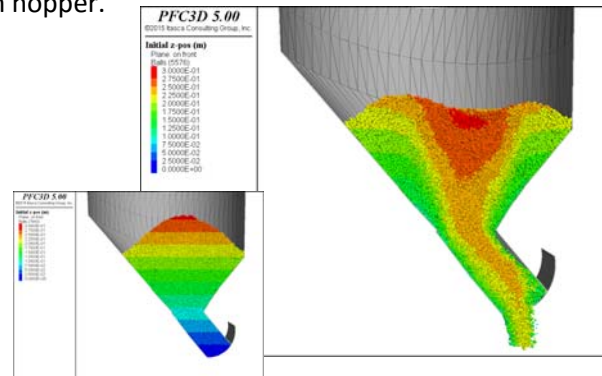
## PROJECT DESCRIPTION

ArcelorMittal

France



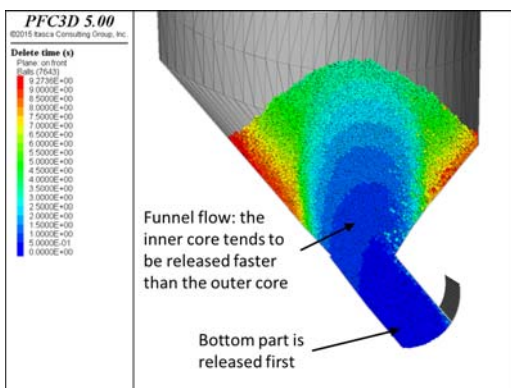
- Evaluate the feasibility of using the distinct- element modeling to study the flow and segregation of frictional particles without cohesion.
- Simulate an experimental test corresponding to the charge/discharge of a scale model batch hopper.



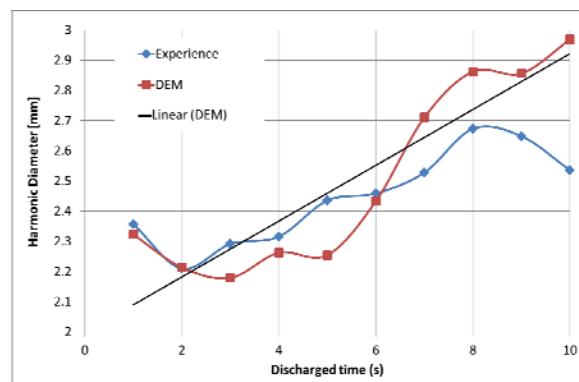
**Contour on initial z-pos – t = 3s**  
(initial Z-pos - t=0s at the bottom left)

## ITASCA'S ROLE

- Discharge of a hopper with a geometry and parameters specified by ArcelorMittal.
- Analyse the segregation observed in the hopper during its discharge and compare against experiments.



**Contour plot of the particles discharge time**  
(time at which particles are deleted)



**Harmonic diameter vs Discharge time**

## PROJECT RESULTS

- Discharge time in the simulation is comparable with the experiments (total discharge in 9.3s in the simulation compared to 10.1 s experimentally).
- The flow during the discharge can be characterized as a funnel flow.
- The time evolution of the harmonic diameter during the discharge process can be measured and well explained by both the segregation observed at the end of the charging phase and the funnel flow.
- The numerical results show a quadratic evolution of the harmonic diameter, whereas it seems more linear in the experiments: grain breakage during impacts and/or particle attrition occur during the experiment (not modelled).